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WATER SUPPLY OUTLOOK FOR WASHINGTON

and

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,

and

DEPARTMENT of WATER RESOURCES STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and Private organizations.

AS OF
FEB. 1, 1969

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1400 snow courses in Western United States and in the Columbia Basin in British Columbia. In the near future, it is anticipated that automatic snow water equivalent sensing devices along with radio telemetry will provide a continuous record of snow water equivalent at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85205
Colorado (N. Mex.)	12417 Federal Building, Denver, Colorado 80521
Idaho	P. O. Box 38, Boise, Idaho 83707
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Building, Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 340, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



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**WATER SUPPLY OUTLOOK
FOR
WASHINGTON**

and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

Issued by

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ADMINISTRATOR
SOIL CONSERVATION SERVICE
WASHINGTON, D.C.

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SPOKANE, WASHINGTON

In Cooperation with

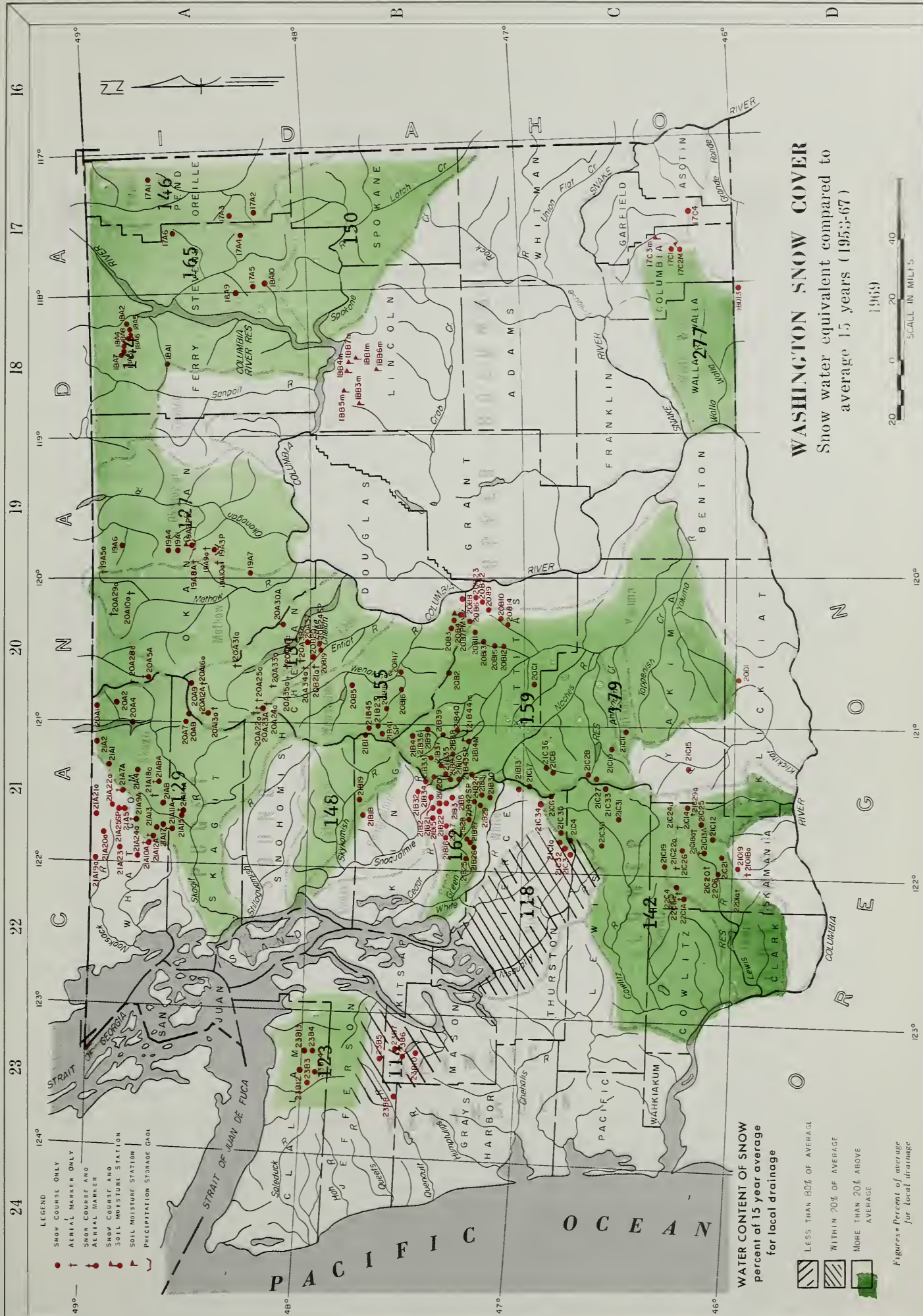
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DEPARTMENT OF WATER RESOURCES
STATE OF WASHINGTON

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Report prepared by

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SOIL CONSERVATION SERVICE
360 U.S. COURTHOUSE
SPOKANE, WASHINGTON 99201



INDEX to WASHINGTON SNOW COURSES, SOIL MOISTURE STATIONS AND PRECIPITATION STORAGE GAGES

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.									
UPPER COLUMBIA DRAINAGE																										
Pend Oreille River																										
Boyer Mountain	17A2	7	31N	43E	5250	Clockum Creek	20R22	11	20N	20E	5700	Divido Meadow	21G29a	21	9N	10E	5600									
Bunchgrass Meadow	17A1	24	37N	44E	5000	Clockum Creek No. 2	20R23	1	21N	20E	4700	Grand Meadow	21G25	28	8N	9E	3500									
Winchester Creek	17A3	30	33N	43E	2970	Squillchuck Creek	20B3	12	21N	19E	4400	Lone Pine Shelter	21G26	8	8N	7E	3800									
Kettle River																										
Boulder Road	18A2	36	30N	36E	1450	Beehive Springs	20B4	16	21N	20E	3400	Marble Mountain	22G5a	24	8N	5E	3200									
Butte Creek	18A3	28	30N	35E	4070	Scout-A-Vista						New Muddy River	22G6	32	8N	6E	2000									
Cabin Creek	18A8	5	38N	36E	3170							Oldman Pass	22D19	22	6N	7E	3100									
Cont Creek	18A4	26	30N	35E	3595							Plains of Abraham	22G1a	35	9N	5E	4400									
Snow Caps Creek	18A5	3	38N	36E	2720							Smith Creek Road	22G2a	19	8N	6E	2100									
Snow Caps Trail	18A6	5	38N	36E	2720							Spencer Meadow	21G20a	16	8N	7E	3400									
Summit G. S.	18A7	20	30N	35E	4600							Surprise Lakes	21G13a	14	7N	8E	4250									
Colville River																										
Baird	17A6	19	36N	42E	3215							Timbered Peak	21D18a	36	6N	6E	3000									
Carlson	18A9	34	32N	38E	2885																					
Chevelah	17A7	11	32N	41E	4925																					
Stranger Mountain	17A5	26	31N	38E	4990																					
Togo	18A10	6	28N	38E	3370																					
Sanpoil River																										
Sherman Creek Pass	18A1	19	36N	35E	5350																					
Okanogan River																										
Clark	19A8a	2	36N	23E	7000																					
Mucknuck	19A9a	20	36N	24E	6750																					
Nutton Creek No. 1	19A1	30	37N	24E	5700																					
Nutton Creek No. 2	19A2	19	37N	24E	6000																					
Payson	20A28a	32	40N	18E	4300																					
Rusty Creek	19A3P	18	35N	24E	4000																					
Salmon Meadows	19A2PM	33	37N	24E	4500																					
Starvation Mtn.	19A10a	15	35N	23E	6750																					
Touts Coulee	19A6	30	39N	25E	2845																					
Methow River																										
Billy Goat Pass	20A10a	10	38N	20E	6400																					
Dollar Hatch	20A29a	8	30N	20E	7000																					
Harts Pass	20A5a	7	37N	18E	6500																					
Horseshoe Basin	19A5a	15	40N	23E	7000																					
Loup Loop	19A7	36	34N	23E	4650																					
Chelon Lake Basin																										
Cloudy Pass	20A22a	12	31N	15E	6500																					
Greenwood Flat	20A25a	3	31N	16E	3540																					
Little Meadows	20A24a	8	31N	16E	5275																					
Lyman Lake	20A23a	18	31N	16E	5900																					
Park Creek Flat	20A13a	18	34N	16E	2220																					
Park Creek Ridge	20A12a	7	34N	16E	4600																					
Petersons	20A16a	3	34N	17E	3730																					
Rainy Pass	20A9	21	35N	17E	4780																					
Safety Harbor	20A30a	32	31N	20E	6300																					
War Creek Pass	20A31a	34	33N	18E	6500																					
Entiat River																										
Brief	20B19	34	28N	19E	1600																					
Entiat Meadows	20A33a	28	31N	17E	4800																					
Entiat River Trail	20A34a	2	29N	17E	3150																					
Fox Camp	20A36a	17	30N	18E	6510																					
Pope Ridge	20B20	22	29N	18E	4300																					
Pope Ridge Snow Pillow	20B24SP	22	29N	18E	4300																					
Pugh Ridge	20A32a	34	30N	18E	6400																					
Shady Pass	20A37	20	29N	19E	6200																					
Snow Brushy	20A35a	21	30N	17E	3850																					
Tommy Creek	20B21a	10	28N	18E	5300																					
Wenatchee River																										
Berne-Mill Creek	21B23	7	26N	15E	2925																					
Berne-Mill Creek (New)	21B41SP	13	26N	14E	3240																					
Blewett Pass No. 2	20B2	35	22N	17E	4270																					
Chivaukum G. S.	20B16	4	25N	17E	1810																					
Lake Wenatchee	20B5	33	27N	17E	1970																					
Leavenworth R. S.	20B17	1	24N	17E	1127																					
Merritt	20B18	4	26N	16E	2140																					
Stevens Pass	21B1	14	26N	13E	4070																					
Stevens Pass Sand Shed	21B45	12	26N	19E	3700																					
LOWER COLUMBIA DRAINAGE																										
Asotin Creek																										
Spruce Springs	17C4	9	8N	42E	5700													Cedar River	21B3	10	21N	10E	2390			
Mill Creek																		21B21	30	22N	10E	3300				
Couse	17C3m	2	9N	35E	3370													City Cabin	21B22	31	22N	10E	2500			
Homestead	17C1	11	9N	40E	4030													Mt. Gardner	21B22	31	22N	10E	2500			
Martin Springs (Helmets SW)	17C2M	23	9N	40E	4400													Mt. Gardner Aux.	21B16	31	22N	9E	2500			
Walla Walla Diversion	18D13	22	6N	38E	2400													Mt. Lindsay	21B15	8	22N	9E	3000			
Klickitat River																		21B17	11	21N	9E	2400				
Satus Pass	20D1	21	6N	17E	4030													Rex River	21B6	24	21N	10E	3000			
West Fork Cabin	21C15	23	9N	12E	3000													South Fork Cedar	21B20	1	21N	10E	3400			
White Salmon River																		Tinkham Creek								
Cultus Creek	21C12	35	7N	8E	4000													Snoqualmie River								
Lewis River																		21B32	16	22N	10E	1675				
Blue Lake	21C22a	19	9N	8E	4800													Bandera Air Strip	21B2	19	22N	11E	3625			
Bob's Trail	21C21	25	8N	7E	2200													Ollalie Meadows	21B18	26	26N	9E	1900			
Calamity Ridge	22D1a	8	5N	5E	2500													South Fork Tolt								
Council Pass	21C18a	24	9N	9E	4200													Lake Elizabeth	21B19	33	26N	10E	2900			
Skykomish River																										

WATER SUPPLY OUTLOOK

State of Washington
February 1, 1969

* The water supply outlook for irrigation and power for the Columbia *
* Basin in Washington and its tributary streams can be considered *
* excellent for this time of year. Snow surveys made in the State *
* and adjacent areas for the first of February show a snowpack that *
* varies from a low of 118% to a high of 277%. The snow cover at *
* lower elevations is considerably better, percentagewise, than that *
* which is found in the upper reaches of the watershed. Likewise, *
* the snow in the British Columbia portions of the watershed is not *
* as great as that experienced in Washington. The soil moisture *
* conditions are generally a little better than that which was ex- *
* perienceed last year at this time but not as good as occurred in *
* 1967. Reservoir storage is only 56% of capacity but close to *
* normal for this time of year. The main power reservoirs all have *
* less than normal amounts of water in storage as of February 1, but *
* all will fill and spill with the spring runoff. January runoff *
* ranged from a low of 65% of normal for the Similkameen River as *
* measured at Nighthawk to a high of 241% for the Walla Walla River *
* at Touchet. *

SNOW COVER

All of the watersheds in the Upper Columbia Basin are well above normal for this time of year. Snow cover ranges from 27% above normal on the Okanogan to a high of 79% above for the Ahtanum Creek, a tributary of the Yakima watershed. Comparing snow cover with last year the percentage figures vary from 25% above on the Kettle River to 151% above for the Wenatchee. On the Lower Columbia drainage area the snow cover varies from 57% above normal for the White Salmon to 177% above on the Mill Creek. Comparing these watersheds with last year the snow cover varies from 55% above to 578% above. In the Puget Sound drainage the snow cover varies from 14% above normal to 62% above and on the Olympic Peninsula, 14% above to 23% above. Generally speaking, the watersheds with the greatest amount, percentagewise, are based on snow courses measured at the lower elevations while the poorer snowpacks are based primarily on high elevation snow cover.

RESERVOIRS

The five reservoirs in the Yakima drainage have 697,000 acre feet in storage as of February 1, compared to last year's 856,740 acre feet and 631,230 acre feet in 1967. While this amount is not excessive at this time the immense amount of snow and water in the mountains behind these reservoirs will assure their filling and probably overflowing with normal precipitation from here on out. These reservoirs will probably have to be lowered for flood control purposes downstream. All power reservoirs are expected to fill and spill early with the spring runoff.

These, too, will probably be lowered for flood control purposes. The two small reservoirs in Okanogan County should have no problems in filling and these reservoirs have no flood control potential.

PRECIPITATION

Fall precipitation was above normal in all drainage divisions reported for the State of Washington with the exception of the Methow-Okanogan. Precipitation in this area was only 75% of normal. During the winter months of November through January, precipitation was above normal in all drainage divisions except for the Upper Columbia in Canada which was 99%. The range of this winter precipitation as reported by the Weather Bureau, River Forecast Center, was 4% above normal on the northwest slopes of the Cascades to 52% in southeastern Washington.

SOIL MOISTURE

The soil mantle as measured at the 13 soil moisture stations is very similar to that which has occurred the last two years and ranges from 40% to 80% of capacity. Cold weather and precipitation in the form of snow that has not melted as yet has resulted in this below normal amount of soil moisture. With the amount of moisture in the snowpack above the soil very little deficit will be felt from this low percentage of water in the soil mantle itself.

STREAMFLOW

Forecasts of streamflows are made only for the main stem of the Columbia River as measured at The Dalles. This forecast for the April-September period is for a flow 16% above normal or 122,000,000 acre feet. The April-June flow is expected to be 86,200,000 acre feet or 19% above normal. Numerical forecasts for other streams will be made by the Soil Conservation Service and released with the March 1 report when a more thorough analysis of the snowpack conditions and how they relate to valley precipitation and other factors can be made.

January flows of the streams in the State were generally above normal except in the Okanogan watershed, along the Puget Sound and the Wind River in the Lower Columbia drainage.



COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

The following tabulation of Washington stream basins presents the water content of the snow about February 1, 1969, as per cent of the same date in 1968 and 1967 and average of record.

Tributary Basin	No. of Courses Average	Years of Record	1969 Snow Water Expressed as per cent of		
			1968	1967	1953-67 Avg.

UPPER COLUMBIA BASIN

Pend Oreille	5 - 7	5 - 32	181	129	146*
Kettle	12 - 19	3 - 29	125	122	144*
Colville	2	7 - 10	183	243	165*
Spokane	5	7 - 24	189	148	150*
Okanogan	14 - 18	2 - 31	115	98	127*
Methow	9 - 10	6 - 31	126	101	143*
Chelan	6 - 7	1 - 15	149	101	131*
Entiat	1 - 8	2 - 8	107	158	160*
Wenatchee	8 - 9	1 - 24	251	164	155*
Yakima	9 - 11	1 - 47	243	172	159*
Ahtanum	1	27	208	352	179*

LOWER COLUMBIA

Mill Creek	3	15	678	296	277*
Klickitat	1	11	346	346	--
White Salmon	2	11	178	132	157*
Lewis	8 - 9	6 - 11	155	150	161*
Cowlitz	7 - 8	5 - 17	189	134	142*

PUGET SOUND

Nisqually	3 - 4	3 - 12	208	87	118*
White	1	17	138	96	114*
Green	5 - 9	7 - 22	372	208	162*
Snoqualmie	1	19	Late Report		
Skykomish	1 - 2	1 - 24	292	153	148*
Skagit	5 - 6	11 - 21	113	101	129*

OLYMPIC PENINSULA

Skokomish	4 - 5	5 - 11	125	111	114*
Elwha	1	9	145	97	123*
Dungeness	1	15	166	101	123*

* Records of less than 15 years used on computation of average



RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR	USABLE ^{1/} CAPACITY	Measured (February)			
			1969	1968	1967	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	225.1	134.1	93.8	238.0	137.0
Columbia	Franklin D. Roosevelt Lake	5232.0	2430.3	2485.1	3477.2	3812.5
Columbia	Banks Lake	761.8	714.9	714.9	761.8	494.0
Okanogan	Conconully Reservoir	13.0	4.3	6.3	3.2	5.6
Okanogan	Salmon Lake	10.5	6.4	9.0	3.2	8.6
Chelan	Lake Chelan	676.1	254.4	461.4	225.0	318.4
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	105.0	126.1	113.0	92.1
Kachess	Kachess Lake	239.0	194.0	211.3	186.3	172.2
Cle Elum	Lake Cle Elum	436.9	253.3	372.1	235.0	241.1
Bumping	Bumping Lake	33.7	4.2	16.9	5.9	9.9
Tieton	Rimrock Lake	198.0	135.7	130.4	91.0	111.3
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1202.9	835.7	1212.6	1132.2	956.3
Skagit	Diablo Reservoir	90.6	82.6	86.0	84.7	85.6
Skagit	Gorge Reservoir	9.8	8.2	7.9	8.4	--

^{1/} Based on Active Storage

* 15-year average 1953-67

SOIL MOISTURE - FEBRUARY

Drainage Basin and Station	Number	Elev.	Profile Depth	(Inches) : Total : Capacity :	Soil Moisture Content (Inches) as of Feb. 1 1969 1968 1967		
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	5.8	6.1	7.9
Jack Woods	18B3m	2600	48	13.6	8.9	7.4	7.9
Krause	18B4m	2440	48	13.6	7.9	5.7	8.4
Sheffels	18B5m	2360	48	13.6	5.8	4.9	7.5
Sherman	18B7m	2440	48	13.6	5.8	5.9	5.6
Wheatridge	18B6m	2200	48	13.6	6.5	6.1	7.8
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	3.0	2.8	3.6
Trout Creek	3-M	3600	48	7.3	3.6*	4.7**	4.4
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	4.5	4.8	4.9
Lake Cle Elum	21B14M	2200	48	12.8	9.1	9.2	9.2
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	10.2	7.5	7.4
Helmrs	17C2M	4400	48	12.0	10.7	11.2	10.0
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	8.7	10.0	10.3

* Nov 1 measurement

** Dec 1 measurement

FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile Depth	(Inches) : Total : Capacity :	Soil Moisture Content (Inches) as of Oct. 1 1968 1967 1966		
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	5.0	4.6	5.0
Jack Woods	18B3m	2600	48	13.6	7.1	5.2	4.3
Krause	18B4m	2440	48	13.6	5.2	4.9	5.1
Sheffels	18B5m	2360	48	13.6	4.9	3.7	3.8
Sherman	18B7m	2440	48	13.6	3.9	3.6	3.7
Wheatridge	18B6m	2200	48	13.6	4.6	4.0	4.1
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	2.7	1.5	3.0
Trout Creek	3-M	3600	48	7.3	4.1	4.0	3.8
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	3.1	4.8	2.4
Lake Cle Elum	21B14M	2200	48	12.8	5.2	9.1	6.4
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	7.4	5.4	5.7
Helmrs	17C2M	4400	48	12.0	7.6	6.7	6.7
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	5.5	5.6	5.7

PRECIPITATION 1/

Division Averages and Departures

Drainage Divisions	FALL		WINTER	
	Sept - Oct	1968 ^{2/}	Nov - Dec 1968	January 1969 ^{2/}
	Average	Departure	Average	Departure
Columbia in Canada	4.82	+ 0.93	8.95	- 0.11
Pend Oreille - Spokane	7.55	+ 3.67	17.08	+ 4.61
Northeastern Washington	3.86	+ 1.49	10.00	+ 2.26
Southeastern Washington	5.18	+ 2.53	12.76	+ 4.34
Central Washington	4.78	+ 0.34	24.86	+ 5.17
North Central Washington	1.05	- 0.36	5.95	+ 1.37
Northwest Slope Cascades	13.60	+ 1.93	37.24	+ 1.61
Southwest Slope Cascades	10.97	+ 3.25	31.42	+ 3.27

Northeastern Washington	- Lower Spokane, Colville, Sanpoil and lower Kettle drainages
Southeastern Washington	- Touchet, Tucannon and Palouse drainages
Central Washington	- Yakima, Wenatchee and Chelan drainages.
North Central Washington	- Methow and Okanogan drainages
Northwest Slope Cascades	- Puget Sound drainages
Southwest Slope Cascades	- Lower Columbia drainages

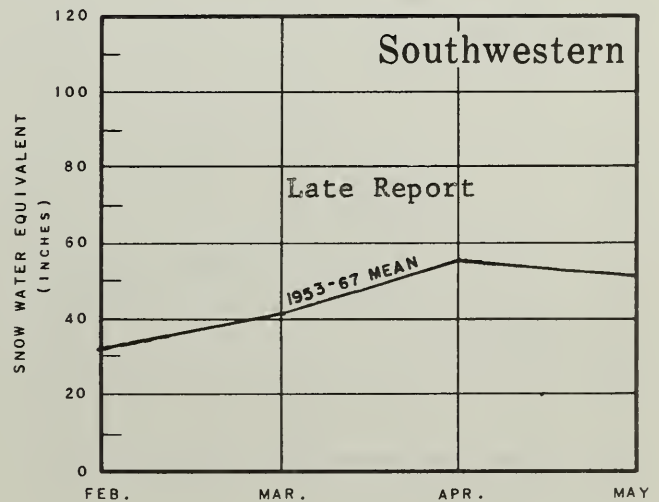
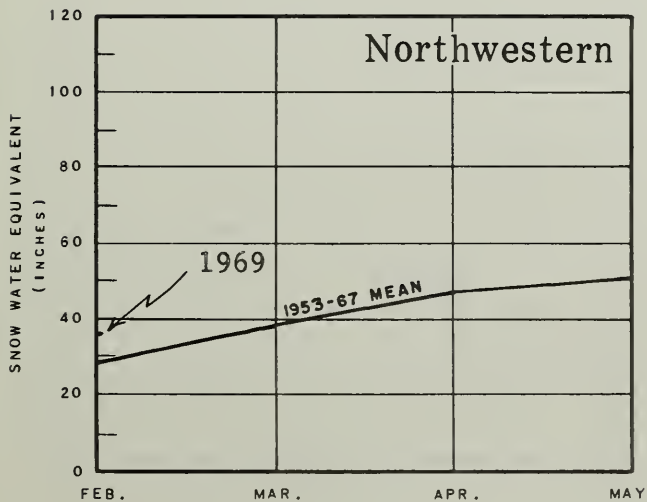
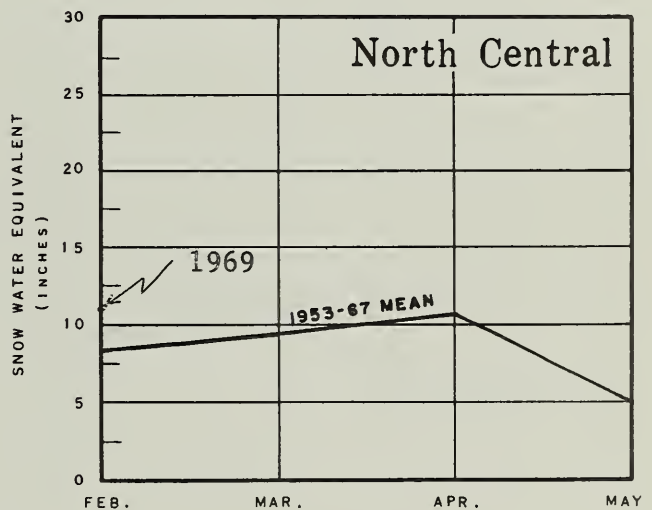
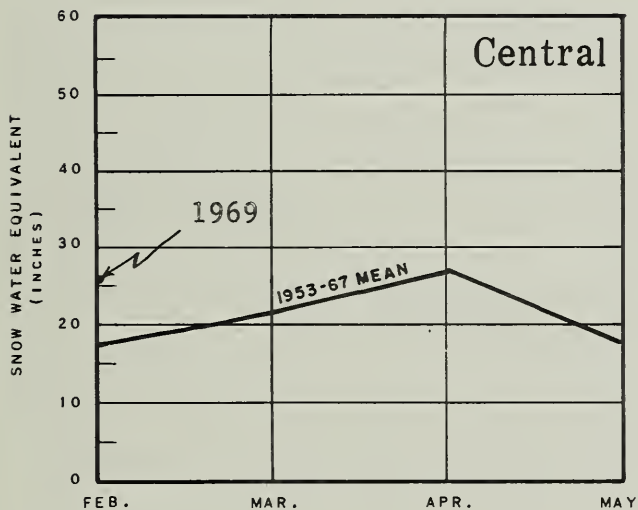
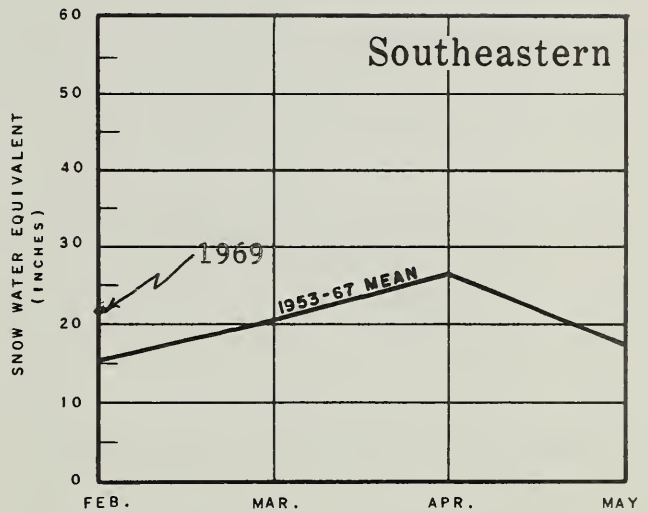
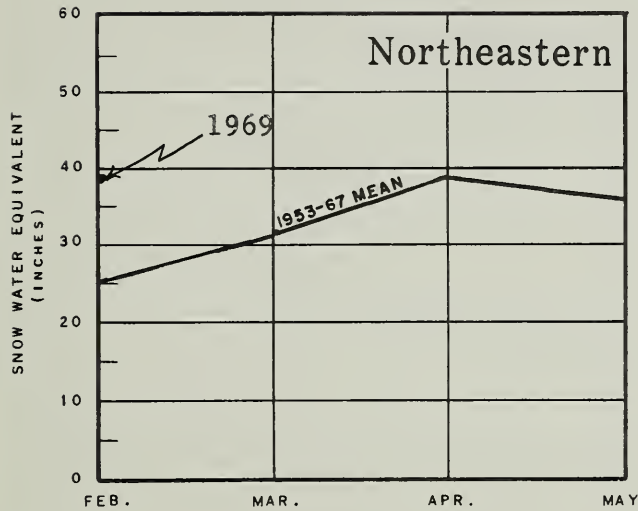
1/ - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau.

2/ - Departure from 15-year (1953-67) drainage division average

WASHINGTON SNOW COVER

1969

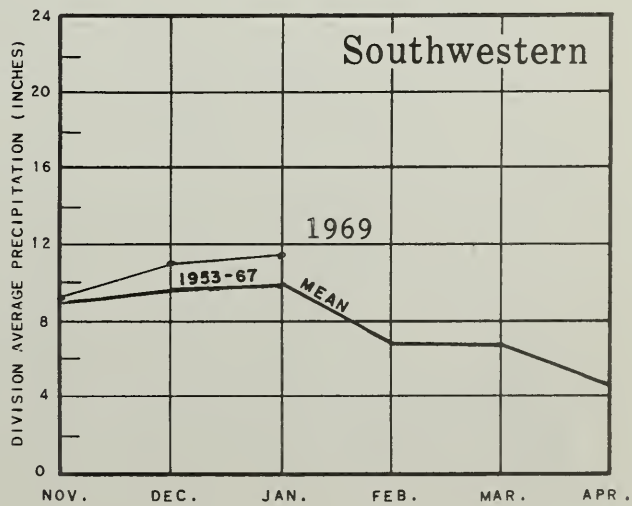
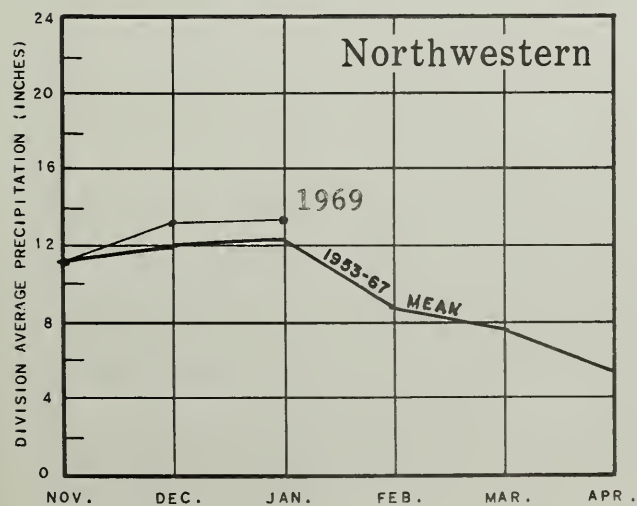
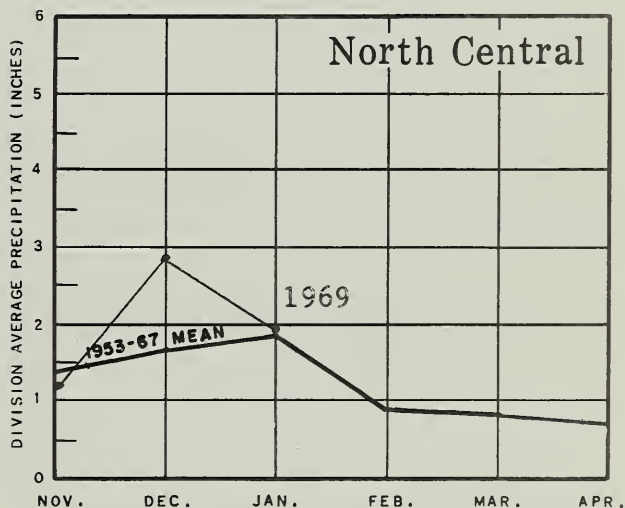
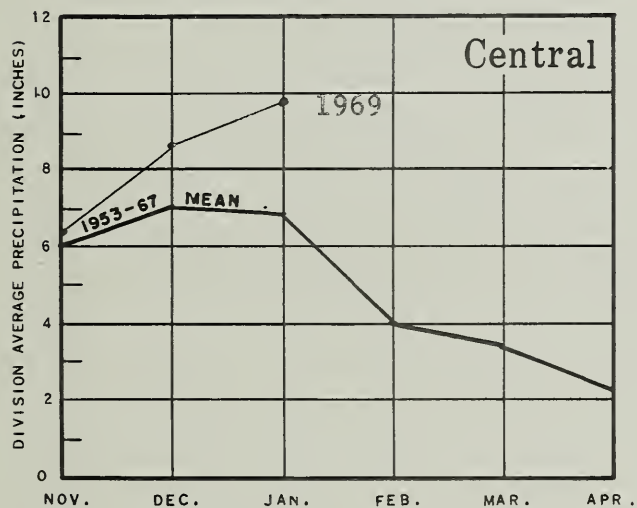
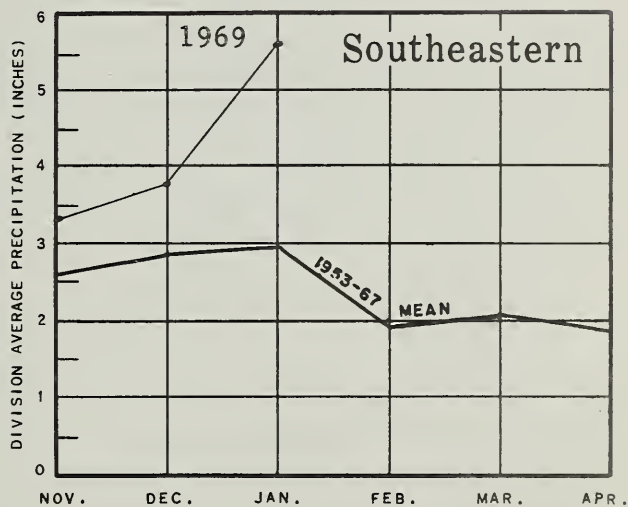
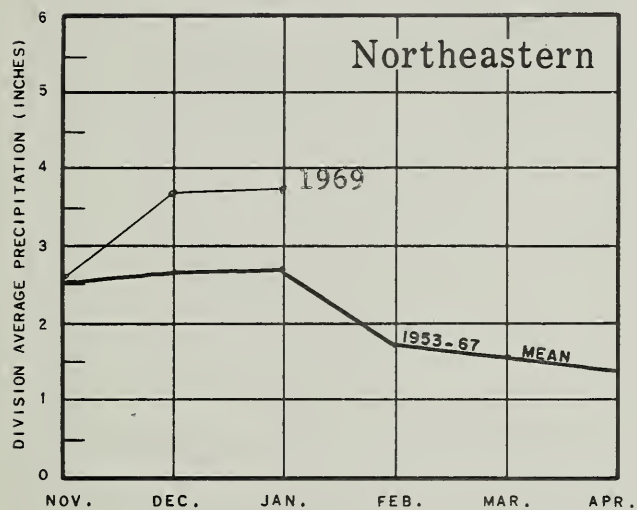
DRAINAGE AREAS



WASHINGTON VALLEY PRECIPITATION

1968-1969

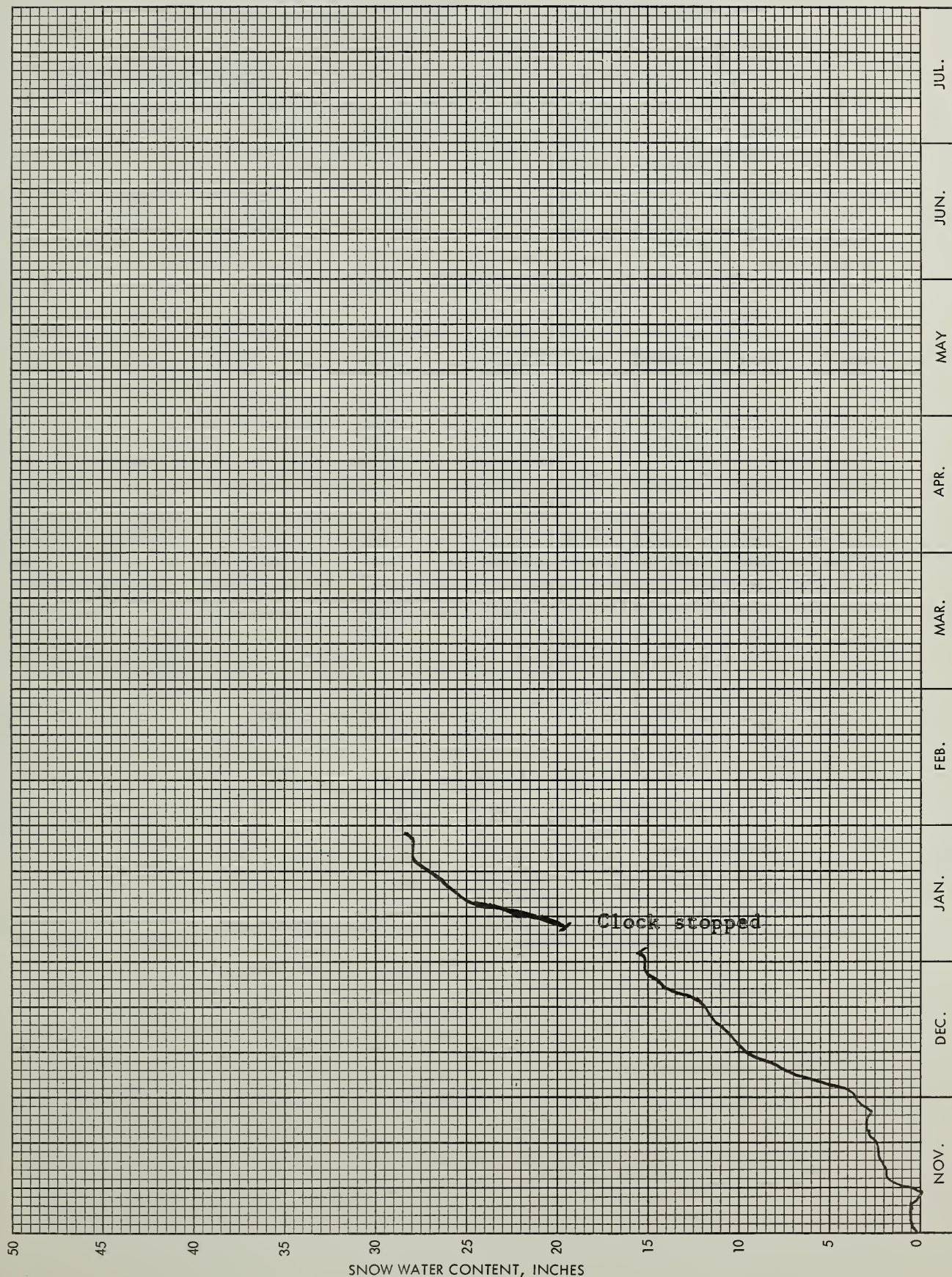
DRAINAGE AREAS



SNOW PILLOW DATA

Berne-Mill Creek

Sec. 13 T. 26N R. 14E No. 21B41SP Drainage: Wenatchee
 Lat. 47° 46' Long. 121° 01' Elev. 3170



SNOW DATA TO FEBRUARY 1, 1969 - APPENDIX 1

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

U P P E R C O L U M B I A D R A I N A G E

PEND OREILLE RIVER

Benton Meadow	16A2	2344	1/2	22	3.7	3.6	2.2	3.2
			1/31	54	10.4	5.6	3.0	5.1
Benton Spring	16A3	4900	1/1	37	9.1	6.2	6.6	8.6
			1/29	67	18.0	10.7	16.9	14.0
#Chewelah	17A4	4925	Late Report			11.1	11.5	13.2*
Lookout	15B2	5250	12/27	77	18.8	11.8	15.6	15.7
			1/31	133	38.7	21.0	29.2	25.0
Nelson	Canada	3050	1/31	61	15.0	11.7	13.2	12.2
Schweitzer Bowl	16A6	4500	12/27	69	18.5	10.7	15.3	--
			1/31	99	28.8	16.7	28.5	--
Schweitzer Ridge	16A5	6100	12/27	104	29.7	15.7	23.0	--
			1/30	161	52.0	22.7	39.2	--
Winchester Creek	17A3	2970	1/29	58	13.3	8.8	6.5	9.2*

KETTLE RIVER

Boulder Road	18A2	1450	10/28	0	0.0	0.0	0.0	--
			11/12	0	0.0	0.0	0.0	--
			11/26	0	0.0	0.0	0.0	--
			12/12	6	1.0	2.6	0.0	--
			1/2	19	3.3	4.0	0.0	2.1*
			1/14	31	6.1	4.6	1.6	3.4*
			1/27	34	6.9	5.4	2.0	4.1*
Big White Mountain	Canada	5500	1/30	56	10.8	14.1	18.9	--

Not located directly on this drainage

* Adjusted 1953-67 average

APPENDIX 2

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.
<u>KETTLE RIVER (Cont.)</u>								
Butte Creek	18A3	4070	10/28	0	0.0	0.0	0.0	--
			11/12	8	1.9	0.0	0.0	--
			11/26	8	2.0	0.0	1.3	1.5*
			12/12	21	4.1	2.9	4.6	2.9*
			1/2	31	7.6	4.5	4.4	4.3*
			1/14	40	9.4	5.6	6.4	5.8*
			1/27	44	9.9	7.5	6.5	6.6*
Cabin Creek	18A8	3170	10/28	0	0.0	0.0	0.0	--
			11/12	7	1.7	0.0	0.0	--
			11/26	7	1.2	0.0	0.6	1.1*
			12/12	17	3.1	2.8	3.0	2.4*
			1/2	30	6.2	4.3	3.3	4.2*
			1/14	39	9.0	5.1	4.8	5.5*
			1/27	42	9.2	6.3	5.3	6.0*
Carmi	Canada	4100	Late Report			--	6.7	--
Farron	Canada	4000	1/30	58	15.3	8.3	11.6	10.0
Goat Creek	18A4	3595	10/28	0	0.0	0.0	0.0	--
			11/12	7	1.4	0.0	0.0	--
			11/26	4	0.1	0.0	0.0	1.0*
			12/12	16	2.8	2.8	3.0	2.1*
			1/2	28	6.4	4.6	2.4	3.7*
			1/14	36	7.9	5.1	4.4	4.9*
			1/27	40	8.8	6.0	5.0	5.5*
Lower Trapping Cr.	Canada	3050	1/30	25	5.2	4.1	5.1	--
#Monashee Pass	Canada	4500	1/30	38	10.3	11.1	11.8	9.9**
Snow Caps Creek	18A5	2150	10/28	0	0.0	0.0	0.0	--
			11/12	0	0.0	0.0	0.0	--
			11/26	0	0.0	0.0	0.0	--
			12/12	8	1.5	2.8	0.0	--
			1/2	24	4.2	4.0	0.0	2.3*
			1/14	32	6.3	4.4	1.5	3.5*
			1/27	37	6.9	5.0	2.0	4.3*

Not located directly on this drainage

* Adjusted 1953-67 average

** Average for years of record

APPENDIX 3

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

KETTLE RIVER (Cont.)

Snow Caps Trail	18A6	2720	10/28	0	0.0	0.0	0.0	--
			11/12	5	1.0	0.0	0.0	--
			11/26	3	0.2	0.0	0.0	--
			12/12	14	2.6	2.6	1.7	1.7*
			1/2	26	5.3	3.9	1.3	3.0*
			1/14	35	7.4	4.5	2.4	4.0*
			1/27	37	8.0	5.6	3.5	4.9*
Summit G. S.	18A7	4600	10/28	0	0.0	0.0	0.0	--
			11/12	9	2.1	0.0	0.0	--
			11/26	9	2.1	0.0	1.6	1.7*
			12/12	18	3.3	2.8	3.9	3.0*
			1/2	27	5.4	3.6	4.1	4.3*
			1/14	33	7.6	4.3	6.1	5.9*
			1/27	38	8.0	5.6	6.3	6.7*
Upper Trapping Cr.	Canada	5500	1/30	36	6.6	6.0	9.0	--

COLVILLE RIVER

Baird	17A6	3215	2/1	43	9.0	5.0	4.6	5.9*
Carlson	18A9	2885	2/1	37	7.8	4.2	2.3	4.3*
Chewelah	17A4	4925	Late Report			11.1	11.5	13.2*
Stranger Mtn.	17A5	4990	Late Report			11.9	6.6	9.8*
Togo	18A10	3370	Late Report			10.6	3.1	8.6*

SPOKANE RIVER

Forty-nine Meadows	15B3A	5000	Not Measured			--	26.4	--
4th of July Summit	16B3	3100	12/30	20	3.7	3.1	2.0	3.5*
			2/3	64	14.0	5.2	4.8	6.4*
Granite Peak	15B13A	6000	Not Measured			--	33.1	--
#Lookout	15B2	5250	12/27	77	18.8	11.8	15.6	15.7
			1/31	133	38.7	21.0	29.2	25.0
Lost Lake	15B14A	6000	Not Measured			--	40.7	--
Medicine Ridge	15B4A	6150	Not Measured			--	40.3	--
Outlaw Creek	15B12A	3750	Not Measured			--	11.5	--
Sherwin	16C1	3200	2/3	64	16.2	7.3	10.0	10.4*

Not located directly on this drainage

* Adjusted 1953-67 average

APPENDIX 4

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.
<u>OKANOGAN RIVER</u>								
Aberdeen Lake	Canada	4300	Not Measured			6.0	5.0	5.1**
Blackwall Mountain	Canada	6250	1/30	71	24.8	28.8	26.8	23.9**
Brookmere	Canada	3200	1/27	32	7.1	6.8	7.6	7.1
Carrs Landing #1	Canada	2250	Not Measured			0.0	--	--
Carrs Landing #2	Canada	3200	2/2	19	3.1	2.5	3.7	--
Clark +	19A8a	7000	Not Measured			--	19.5	--
Copper Mountain	Canada	4300	2/1	26	5.4	1.5	4.3	5.0**
Enderby	Canada	6250	1/29	106	34.0	26.1	34.4	22.5**
Hamilton Hill	Canada	4900	Not Measured			9.1	13.9	10.0**
#Harts Pass	20A5A	6500	2/3	106	36.7	42.0	36.3	28.2*
#Horseshoe Basin +	19A5a	7000	2/3	48	15.4	8.4	14.9	9.7*
Isintok Lake	Canada	6300	2/2	27	5.7	5.4	7.4	--
Lost Horse Mountain	Canada	6300	2/3	28	6.2	--	8.2	6.0**
#Loup Loup	19A7	4650	1/30	43	11.6	7.9	7.5	6.6*
McCulloch	Canada	4200	1/28	30	5.0	4.8	5.8	4.8
Missezula Mountain	Canada	5100	Not Measured			--	9.2	6.2**
Mission Creek	Canada	6000	1/26	57	16.7	15.0	17.7	13.0**
Monashee Pass	Canada	6000	1/30	38	10.3	11.1	11.8	9.9**
Mount Kobau	Canada	5950	2/1	39	10.7	9.7	12.0	--
Muckamuck +	19A9a	6390	Not Measured			--	15.5	--
Mutton Creek #1	19A1	5700	2/4	48	15.0	10.3	16.0	9.7*
Mutton Creek #2	19A4	6000	2/4	47	15.5	9.2	16.6	10.1*
New Copper Mountain	Canada	4300	2/1	31	6.5	3.0	5.1	5.1**
Paysayten +	20A28a	4300	2/3	60	19.2	7.7	17.8	11.6*
Postill Lake	Canada	4500	1/31	32	5.7	6.6	7.0	5.8**
#Quartette Lake	Canada	4000	Not Measured			--	8.7	--
Rusty Creek	19A3	4000	2/6	34	10.0	5.5	5.6	5.6
Salmon Meadows	19A2	4500	2/4	42	11.0	6.9	6.4	7.3*
Silver Star Mountain	Canada	6050	2/4	78	28.4	24.3	25.7	16.9**
Starvation Mountain +	19A10a	6750	Not Measured			--	19.5	--
Summerland Res.	Canada	4200	2/1	32	7.3	6.8	8.8	--
Touts Coulee	19A6	2845	1/31	24	4.6	3.4	2.3	3.1*
Trout Creek	Canada	4700	2/1	29	5.5	4.3	5.6	5.3

METHOW RIVER

Billy Goat Pass +	20A10a	6409	2/3	90	28.8	22.7	37.6	21.5*
Dollar Watch +	20A29a	7000	2/3	74	23.7	19.8	25.7	18.4*
Harts Pass	20A5A	6500	2/3	106	36.7	42.0	36.3	28.2*
Horseshoe Basin +	19A5A	7000	2/3	48	15.4	8.4	14.9	9.7*

Not directly located on this drainage

* Adjusted 1953-67 average

** Average for years of record

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 5

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

METHOW RIVER (Cont.)

Loup Loup	19A7	4650	1/30	43	11.6	7.9	7.5	6.6*
#Mutton Creek #1	19A1	5700	2/4	48	15.0	10.3	16.0	9.7*
#Mutton Creek #2	19A4	6000	2/4	47	15.5	9.2	16.6	10.1*
#Rusty Creek	19A3	4000	2/6	34	10.0	5.5	5.6	5.6
#Salmon Meadows	19A2	4500	2/4	42	11.0	6.9	6.4	7.3*
#War Creek Pass +	20A31a	6500	2/3	117	37.4	29.9	--	--

CHELAN LAKE BASIN

Cloudy Pass +	20A22a	6500	2/3	107	34.2	24.9	36.5	27.4*
Greenwood Flat +	20A25a	3540	2/3	97	31.0	--	--	--
Little Meadows +	20A24a	5275	2/3	130	41.6	29.9	38.4	29.9*
Lyman Lake +	20A23A	5900	2/3	167	53.4	--	50.6	38.9*
Park Creek Flat +	20A13a	2220	Not Measured			23.2	27.5	27.8*
Park Creek Ridge	20A12A	4600	2/3	146	46.7	18.8	46.7	35.3*
Petersons +	20A16a	3730	2/3	97	31.0	19.1	32.6	26.2*
Rainy Pass	20A9	4780	2/3	110	36.6	29.7	36.0	27.5*
Safety Harbor	20A30A	6300	Late Report			--	20.8	--
War Creek Pass +	20A31a	6500	2/3	117	37.4	29.9	--	--

ENTIAT RIVER

Brief	20B19	1600	1/26	44	10.1	6.0	5.0	6.3*
Entiat Meadows +	20A33a	4800	2/5	134	38.2	41.4	26.4	--
Entiat River Tr +	20A34a	3150	2/5	90	25.7	18.0	13.7	--
Fox Camp +	20A36a	6510	2/5	152	43.3	45.6	31.2	--
Pope Ridge	20B20	4300	1/30	72	20.5	11.0	11.4	--
Pope Ridge SP	20B24SP	4300	Not Available			--	--	--
Pugh Ridge +	20A32a	6400	2/5	97	27.7	29.1	16.6	--
Shady Pass	20A37	6200	Not Measured			--	--	--
Snow Brushy +	20A35a	3850	2/5	109	31.1	33.3	18.9	--
Tommy Creek +	20B21a	5300	2/5	80	22.8	20.4	16.0	--

WENATCHEE RIVER

Berne-Mill Creek	21B23	2925	11/15	16	2.6	0.0	1.8	1.2*
			11/29	22	5.0	1.8	2.5	4.8*
			12/13	43	11.0	5.5	7.7	7.3*
			12/30	61	16.2	5.9	7.8	11.4*
			1/15	90	27.2	9.9	13.0	17.1*
			1/29	86	30.3	12.9	18.8	20.7*

Not located directly on this drainage

* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 6

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

WENATCHEE RIVER (Cont.)

Berne-Mill Cr New	21B41SP	3240	11/29	22	5.0	1.3	2.0	--
			12/30	56	16.0	3.5	6.8	--
			1/29	83	30.0	9.9	17.2	--
Blewett Pass #2	20B2	4270	1/6	42	11.7	4.9	1.9	6.3
			2/5	66	31.7	10.8	8.2	11.2
Chiwaukum G. S.	20B16	1810	11/29	7	1.2	0.5	0.0	--
			12/13	23	4.0	3.1	2.0	2.7*
			12/30	32	5.6	3.4	1.6	4.6*
			1/15	52	11.4	5.0	3.8	7.5*
			1/29	49	12.8	8.2	6.4	9.0*
Lake Wenatchee	20B5	1970	11/29	5	0.5	0.5	0.0	--
			12/13	24	5.0	2.5	2.1	3.7
			12/30	39	7.6	4.3	2.1	5.8*
			1/15	55	15.0	7.0	5.7	9.6*
			1/29	56	15.6	8.7	9.3	12.0*
Leavenworth R.S.	20B17	1127	10/30	0	0.0	0.0	0.0	--
			11/14	0	0.0	0.0	0.3	--
			11/26	0	0.0	0.7	0.0	--
			12/12	6	2.4	1.8	1.1	--
			12/27	29	5.4	2.5	0.0	2.9*
			1/13	38	7.7	5.0	0.0	4.0*
			1/27	38	9.0	5.2	2.0	5.0*
#Lyman Lake +	20A23A	5900	2/3	167	53.4	--	50.6	38.9*
Merritt	20B18	2140	11/15	6	1.0	0.0	0.5	--
			11/29	9	2.0	1.0	0.5	2.9*
			12/13	26	5.8	3.6	3.3	4.6*
			12/30	43	10.2	4.2	3.5	8.0*
			1/15	63	19.4	6.2	4.9	12.0*
			1/29	62	20.4	8.8	9.2	14.1*
Stevens Pass	21B1	4070	11/15	35	7.0	0.0	3.4	--
			11/29	56	12.1	3.2	5.2	10.0*
			12/13	85	21.9	8.8	13.9	14.7*
			12/30	110	29.7	10.5	15.2	20.8
			1/15	144	47.5	15.6	24.4	26.6
			1/29	138	51.5	18.0	33.7	34.4

Not located directly on this drainage

* Adjusted 1953-67 average

APPENDIX 7

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953 - 67 Avg.

WENATCHEE RIVER (Cont.)

Stevens Pass Sand Shed 21B45	3700	11/15	21	14.6	--	--	--
		11/29	32	6.8	1.7	--	--
		12/13	55	14.5	6.0	--	--
		12/30	74	19.4	5.2	--	--
		1/15	109	33.6	10.2	--	--
		1/29	102	37.0	12.3	--	--

COLOCKUM CREEK

Colockum Creek	20B22	5300	1/30	53	14.6	--	--	--
Colockum Creek #2	20B23	4300	1/30	42	10.2	--	--	--

SQUILCHUCK CREEK

Beehive Springs	20B3	4400	1/27	41	11.4	7.2	2.9	5.1*
Scout-A-Vista	20B4	3400	1/27	42	10.7	8.5	3.0	5.4*

STEMILT CREEK

Jump-Off	20B8	4450	1/28	40	9.8	8.0	2.4	4.8*
Stemilt Slide	20B6	5000	1/28	53	15.4	10.9	7.7	10.0*
Upper Wheeler	20B7	4400	1/28	45	12.6	8.7	2.6	6.5*

YAKIMA RIVER

#Ahtanum R. S.	21C11	3100	12/27	22	4.0	3.1	1.8	3.2*
			1/27	40	10.2	4.9	2.9	5.7
#Blewett Pass #2	20B2	4270	1/6	42	11.7	4.9	1.9	6.3
			2/5	66	31.7	10.8	8.2	11.2
Bumping Lake (Old)	21C8	3450	12/2	2	0.1	0.6	--	3.8*
			12/19	20	4.1	3.2	3.3	4.6*
			1/1	Not Measured		3.5	3.8	6.6
			1/13	58	14.7	8.2	4.7	10.6*
			1/31	73	17.4	9.2	10.2	12.3
Bumping Lake (New)	21C36	3400	12/2	4	0.2	1.0	--	--
			12/19	22	4.5	3.9	4.8	--
			1/1	Not Measured		5.1	4.8	--
			1/13	63	16.6	10.1	6.5	--
			1/31	82	21.3	12.1	14.1	--

Not located directly on this drainage

* Adjusted 1953-67 average

APPENDIX 8

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.
<u>YAKIMA RIVER (Cont.)</u>								
#Cayuse Pass	21C6	5300	1/2	137	43.0	26.6	38.2	--
			1/28	181	64.4	46.6	67.1	56.3*
Colockum Pass	20B9	5370	2/6	53	14.8	10.7	9.7	--
Cooke Creek	20B10	4123	2/6	33	6.1	2.9	1.8	5.0*
Grouse Camp	20B11	5385	2/6	56	16.4	10.9	10.2	12.2*
High Creek	20B12	2930	2/6	36	8.5	4.6	0.0	4.6*
Joe Lake +	21B46a	4624	1/23	165	41.2	New Aerial Marker		
Lake Cle Elum	21B14M	2200	12/14	12	3.2	--	--	--
			12/26	30	6.3	0.0	0.0	3.9
			1/14	49	12.3	3.5	--	--
			1/29	49	15.4	0.5	3.0	7.8
Lemah Creek +	21B47a	3327	1/23	126	31.5	New Aerial Marker		
Manashtash	20C1	3935	2/6	29	6.0	3.3	2.8	3.4*
Morse Lake	21C17	5400	1/29	140	51.4	31.8	51.1	39.7*
Nanum	20B13	3875	2/6	46	10.6	6.5	3.1	6.9*
#Olallie Meadows	21B2	3625	Late Report			19.1	28.1	30.2
#Satus Pass	20D1	4030	2/1	58	14.9	4.3	4.3	--
Snoqualmie Pass	21B33SP	3020	1/1	Not Measured		5.9	8.4	--
#Stampede Pass	21B10	3000	10/31	4	0.3	--	--	--
			11/14	16	1.4	--	1.8	--
			11/28	30	11.7	1.6	5.2	7.4*
			12/16	86	31.8	4.9	8.5	--
			12/30	92	32.0	8.7	14.5	16.9*
			1/13	143	45.4	11.2	15.8	--
			1/27	158	50.0	17.9	27.6	28.8
Trail Creek	20B14	3360	2/6	20	4.5	1.1	0.0	--
Tunnel Avenue	21B8	2450	12/13	23	6.3	2.6	2.8	--
			1/1	Not Measured		3.4	3.4	8.6
			1/14	84	23.8	5.2	5.3	--
			1/28	78	25.6	8.1	10.7	17.0
Walters Flat	20B15	3360	2/6	41	8.9	6.2	1.8	5.9*
White Pass (E. Side)	21C28	4500	12/3	12	3.2	--	--	--
			12/16	39	8.2	4.5	--	--
			1/1	Not Measured		3.9	7.9	11.1*
			1/15	70	20.1	6.4	11.7	13.7
			1/30	77	23.4	9.4	15.6	16.7*
White Pass (L. Lake)	21C27	4500	12/3	12	3.8	--	--	--
			12/16	45	9.5	5.0	--	--
			1/3	74	20.8	1.1	12.6	13.3*
			1/15	81	27.0	6.7	14.1	--
			1/28	82	29.0	10.6	21.4	20.6*

Not located directly on this drainage

* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 9

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

AHTANUM CREEK

Ahtanum R. S.	21C11	3100	12/27	22	4.0	3.1	1.8	3.2*
			1/27	40	10.2	4.9	2.9	5.7

ASOTIN CREEK

Spruce Springs	17C4	5700	1/28	72	23.6	11.2	14.8	--
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MILL CREEK

Homestead	17C1	4030	2/4	49	16.4	2.8	5.8	5.5*
Martin Springs	17C2	4400	2/4	58	19.1	3.7	9.1	8.4*
Walla Walla Div.	18D13	2400	Not Measured			0.0	0.0	--
			2/1	30	8.6	0.0	0.0	2.0*

KLICKITAT RIVER

Satus Pass	20D1	4030	2/1	58	14.9	4.3	4.3	--
West Fork Cabin	21C15	3000	Not Measured			5.1	--	--
			Not Measured			--	4.2	7.8*

WHITE SALMON RIVER

Cultus Creek	21C12	4000	1/10	114	28.0	13.2	18.1	15.4*
			2/6	140	45.3	27.4	36.3	29.4*
#Surprise Lakes	21C13A	4250	1/1	Not Measured		14.3	18.2	18.5*
			2/6	146	52.3	27.4	37.7	32.7*
Old Man Pass	21D19	3100	Not Measured			8.6	1.9	4.1*
			1/28	93	24.8	15.9	10.9	12.5*

LEWIS RIVER

Blue Lake +	21C22a	4800	Not Measured			24.3	36.4	30.1*
			Late Report			53.0	64.0	56.0*
Bob's Trail	21C21	2200	1/1	Not Measured		6.6	2.4	6.3*
			1/28	72	18.0	12.4	12.3	9.7*
Calamity Ridge +	22D1a	2500	Not Measured			--	0.0	--
			Late Report			3.2	0.0	--
Council Pass +	21C18a	4200	Not Measured			9.5	--	18.4*
			Late Report			24.4	29.3	27.4*

Not located directly on this drainage

* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 10

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

LEWIS RIVER (Cont.)

#Cultus Creek	21C12	4000	1/10	114	28.0	13.2	18.1	15.4*
			2/6	140	45.3	27.4	36.3	29.4*
Divide Meadow +	21C29a	5600	Not Measured			13.7	--	24.7*
			Late Report			30.0	42.6	39.5*
Grand Meadow	21C25	3500	1/7	61	16.4	8.2	2.2	9.7*
			2/6	93	36.6	16.2	17.0	16.9*
Lone Pine Shelter	21C26	3800	1/4	65	19.1	17.3	17.0	--
			2/5	126	38.4	31.6	33.2	28.8*
Marble Mountain +	22C5a	3200	Not Measured			11.2	3.3	--
			Late Report			22.1	16.8	--
#Mosquito Meadows	21C19	4100	1/4	63	18.0	18.6	17.1	--
			2/5	120	37.5	33.9	34.9	31.8*
New Muddy River	22C6	1400	1/1	Not Measured		4.1	1.9	--
			1/28	76	20.0	8.4	2.4	--
Old Man Pass	21D19	3100	1/1	Not Measured		8.6	1.9	4.1*
			1/28	93	24.8	15.9	10.9	12.5*
Plains of Abraham +	22C1a	4400	Not Measured			17.8	30.1	22.1*
			Late Report			42.9	52.5	39.0*
Smith Creek Road	22C4	2100	1/1	Not Measured		11.9	--	6.5*
			1/28	105	27.5	20.3	15.1	11.9*
Spencer Meadow +	21C20a	3400	Not Measured			12.6	4.9	7.8*
			Late Report			18.4	17.5	14.3*
Surprise Lakes	21C13A	4250	1/1	Not Measured		14.3	18.2	18.5*
			2/6	146	52.3	27.4	37.7	32.7*
Table Mountain +	21C24a	4200	Not Measured			14.7	18.5	21.1*
			Late Report			28.1	34.6	32.1*
Timbered Peak +	21D18a	3000	Not Measured			8.1	1.5	--
			Late Report			9.6	10.0	12.5*

COWLITZ RIVER

Cayuse Pass	21C6	5300	1/2	137	43.0	26.6	38.2	--
			1/28	181	64.4	46.6	67.1	56.3*
Mosquito Meadows	21C19	4100	1/4	63	18.0	18.6	17.1	--
			2/5	120	37.5	33.9	34.9	31.8*
Ohanapecosh	21C31	2870	1/3	39	9.6	--	3.3	--
			1/28	58	17.3	7.2	10.8	13.7*
Packwood Lake	21C31	2870	1/2	42	9.4	2.0	3.3	--
			2/4	69	19.2	5.5	8.0	8.6*
Pigtail Peak	21C33	5900	1/3	127	41.8	20.0	28.4	--
			1/15	148	51.4	27.1	--	--
			1/28	141	36.6	34.8	46.3	--

Not located directly on this drainage

* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 11

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

COWLITZ RIVER (Cont.)

Plains of Abraham +	22C1a	4400	Not Measured			17.8	30.1	22.1*
			Late Report			42.9	52.5	39.0*
Potato Hill	21C14	4500	1/5	73	22.9	10.2	10.5	--
			2/5	105	36.6	15.4	22.2	20.8*
#White Pass (E.Side)	21C28	4500	12/3	12	3.2	--	--	--
			12/16	39	8.2	4.5	--	--
			1/1	Not Measured		3.9	7.9	11.1*
			1/15	70	20.1	6.4	11.7	13.7*
			1/30	77	23.4	9.4	15.6	16.7*
#White Pass (L.Lake)	21C27	4500	12/3	12	3.8	--	--	--
			12/16	45	9.5	5.0	--	--
			1/3	74	20.8	1.1	12.6	13.3*
			1/15	81	27.0	6.7	14.1	--
			1/28	82	29.0	10.6	21.4	20.6*
Willame Creek	21C30	3250	1/2	57	14.8	6.3	9.6	--
			2/3	98	27.4	12.6	22.7	21.4*

PUGET SOUND DRAINAGENISQUALLY RIVER

Ghost Forest	21C4	4550	12/30	69	20.9	9.3	10.2	--
			1/27	106	36.4	15.0	37.5	30.7*
Longmire	21C3	2760	12/30	22	5.1	0.3	0.2	--
			1/27	43	12.0	3.0	8.6	7.3*
New Paradise Park	21C35	5500	12/30	86	31.5	17.8	20.5	--
			1/27	126	43.8	25.3	59.8	--
Stem Glade	21C1	5050	12/30	108	36.9	16.9	24.3	--
			1/27	150	52.4	26.1	60.4	47.1*

WHITE RIVER

#Cayuse Pass	21C6	5300	1/2	137	43.0	26.6	38.2	--
			1/28	181	64.4	46.6	67.1	56.3*
White River Campgr	21C34	4000	Not Measured			--	7.3	--
			Not Measured			--	20.6	--

Not located directly on this drainage

* Adjusted 1953-67 average

APPENDIX 12

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.
<u>GREEN RIVER</u>								
Airstrip	21B24	1800	12/4	8	0.9	0.8	0.0	--
			1/1	Not Measured		0.0	0.0	--
			2/3	49	13.2	0.0	1.2	--
Charley Creek	21B25	1200	12/4	5	0.9	0.0	0.0	--
			1/6	13	4.1	0.0	0.0	--
			2/3	34	8.6	0.0	0.0	--
Cougar Mountain	21B42SP	3200	Late Report			4.2	--	--
Grass Mtn #1	21B26	4000	12/4	16	4.9	0.6	0.0	--
			1/8	50	19.3	1.3	0.7	7.2*
			2/3	95	35.2	3.8	12.5	13.3*
Grass Mtn #2	21B27	2900	12/4	15	3.1	0.0	0.0	2.7*
			1/1	Not Measured		0.0	1.7	6.0*
			1/28	68	22.8	8.0	--	13.6*
Grass Mtn #3	21B28	2100	12/4	10	1.0	0.0	0.0	--
			1/1	Not Measured		0.0	0.0	--
			2/3	57	16.4	0.0	0.0	--
Lester Creek	21B29	3100	12/4	26	4.4	1.2	0.0	--
			1/1	Not Measured		5.2	3.2	--
			2/3	95	27.3	11.8	13.5	--
Sawmill Ridge	21B29	4700	12/4	45	9.0	1.9	4.3	8.0*
			1/8	85	25.0	7.0	8.6	12.0*
			2/3	108	35.4	15.0	27.9	27.8*
Snowshoe Butte	21B43SP	5000	Late Report			14.6	--	--
Stampede Pass	21B10	3000	10/31	4	0.3	--	--	--
			11/14	16	1.4	--	1.8	--
			11/28	30	11.7	1.6	5.2	7.4*
			12/16	86	31.8	4.9	8.5	--
			12/30	92	32.0	8.7	14.5	16.9*
			1/13	143	45.4	11.2	15.8	--
			1/27	158	50.0	17.9	27.6	28.8
Twin Camp	21B30	4100	12/4	28	6.1	1.8	2.0	5.3*
			1/7	64	15.8	2.1	4.3	10.8*
			2/3	76	22.8	5.8	17.6	19.3*

SNOQUALMIE RIVER

Olallie Meadows	21B2	3625	Late Report			19.1	28.1	30.2
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* Adjusted 1953-67 average

APPENDIX 13

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

SKYKOMISH RIVER

#Stevens Pass	21B1	4070	11/15	35	7.0	0.0	3.4	--
			11/29	56	12.1	3.2	5.2	10.0*
			12/13	85	21.9	8.8	13.9	14.7*
			12/30	110	29.7	10.5	15.2	20.8
			1/15	144	47.5	15.6	24.4	26.6
			1/29	138	51.5	18.0	33.7	34.4
#Stevens Pass Sand Shed 21B45		3700	11/15	21	14.6	--	--	--
			11/29	32	6.8	1.7	--	--
			12/13	55	14.5	6.0	--	--
			12/30	74	19.4	5.2	--	--
			1/15	109	33.6	10.2	--	--
			1/29	102	37.0	12.3	--	--

SKAGIT RIVER

#Cloudy Pass +	20A22a	6500	2/3	107	34.2	24.9	36.5	27.4*
Devils Park	20A4	5900	1/30	91	33.7	34.8	38.0	30.2*
#Harts Pass	20A5A	6500	2/3	106	36.7	42.0	36.3	28.2*
Klesilkwa	Canada	3700	Late Report			5.4	9.4	9.5**
#Lyman Lake	20A23A	5900	2/3	167	53.4	--	50.6	38.9*
New Tashme	Canada	2500	2/1	51	11.8	3.6	7.0	7.6
#Rainy Pass	20A9	4780	2/3	110	36.6	29.7	36.0	27.5*
Meadow Cabins	20A8	1900	1/30	36	10.5	--	--	--

BAKER RIVER

Dock Butte +	21A11A	3800	12/13	70	16.8	--	--	--
			12/29	86	22.4	--	--	--
			1/18	148	42.9	--	--	--
			Late Report			27.7	47.0	46.8*
Easy Pass +	21A7A	5200	12/29	103	26.8	--	--	--
			1/18	158	45.8	--	--	--
			Late Report			34.3	64.2	59.0*
Jasper Pass +	21A6A	5400	12/29	158	41.0	--	--	--
			1/18	215	62.4	--	--	--
			Late Report			52.6	81.5	68.5*
Marten Lake +	21A9A	3600	12/13	72	17.3	--	--	--
			12/29	108	28.1	--	--	--
			1/18	183	53.1	--	--	--
			Late Report			35.0	65.5	56.4*

Not located directly on this drainage

** Average for years of record

* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 14

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.
<u>BAKER RIVER (Cont.)</u>								
Mt. Blum +	21A18a	5800	12/29	86	22.4	--	--	--
			1/18	126	36.5	--	--	--
			Late Report			28.8	58.8	--
#Panorama	21A5	4300	1/13	139	40.0	40.4	47.4	51.2*
			1/26	142	49.0	51.4	69.6	59.2*
Rocky Creek +	21A12A	2100	12/13	12	2.9	--	--	--
			12/29	48	12.5	--	--	--
			1/18	88	25.5	--	--	--
Schreibers Meadow +	21A10A	3400	Late Report			15.7	23.2	19.6*
			12/13	50	12.0	--	--	--
			12/29	82	21.3	--	--	--
S. F. Thunder Creek +	21A14A	2200	1/18	150	43.5	--	--	--
			Late Report			17.5	46.4	42.5*
			12/29	20	5.2	--	--	--
Watson Lakes	21A8A	4500	1/18	48	13.9	--	--	--
			Late Report			2.9	2.4	4.6*
			12/29	92	23.9	--	--	--
			1/18	138	40.0	--	--	--
			Late Report			26.3	46.3	46.0*

NOOKSACK RIVER

Panorama	21A5	4300	1/13	139	40.0	40.0	47.4	51.2*
			1/26	142	49.0	51.4	69.6	59.2*

OLYMPIC PENINSULADUNGENESS RIVER

Deer Park	23B4	5200	1/27	61	20.1	12.1	19.9	16.3*
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MORSE CREEK

Deer Park G. S.	23B13	4850	1/27	48	14.5	7.9	11.9	--
Morse Creek	23B12	5425	Not Measured			--	31.2	--
Cox Valley	23B14	4500	1/29	99	32.3	27.9	--	--

Not located directly on this drainage

* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 15

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

ELWHA RIVER

Hurricane	23B3	4500	1/31	74	21.5	14.8	22.1	17.5*
-----------	------	------	------	----	------	------	------	-------

SKOKOMISH RIVER

Black & White	23B7	4200	12/30	62	19.5	18.0	16.8	--
			2/5	128	43.2	31.8	35.2	29.0*
Black & White Lakes	23B6	4700	12/30	85	30.6	22.9	28.9	--
			2/5	138	49.8	40.5	54.1	41.5*
Four Streams	23B10	3000	12/30	46	14.7	18.1	9.8	--
			2/5	112	35.4	33.7	24.9	--
Home Sweet Home	23B5	5200	12/30	128	43.2	26.4	40.2	--
			2/5	186	67.5	52.5	65.2	54.8*
Sundown Pass	23B8	3900	12/30	92	31.0	24.4	--	--
			2/5	165	55.8	43.3	48.0	36.5*

* Adjusted 1953-67 average

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Water Resources
Washington State Department of Natural Resources

Federal:

Department of the Army
Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
Weather Bureau
U. S. Department of the Interior
Bonneville Power Administration
Bureau of Reclamation
Geological Survey
National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

City of Walla Walla
City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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